ANNUAL REPORT OF THE CALIFORNIA ACADEMY OF SCIENCES 1967-1968

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CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK, SAN FRANCISCO, CALIFORNIA 94118

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A MESSAGE FROM THE CHAIRMAN

THE California Academy of Sciences is the oldest scientific educational institution in the West. It was founded in 1853, fifteen years before the University of California at Berkeley. It is of historic interest and is probably more than coincidental that both Darwin and Huxley had been in the Pacific making their extensive and vastly important biological studies in the preceding two decades. Darwin's *Origin of Species* was published in 1859. The middle and latter part of the 19th century was a period when there was widespread interest in biology. Through these early scientific efforts, man was pushing ahead to find answers other than prevailing theological ones to better understand the world in which he lived.

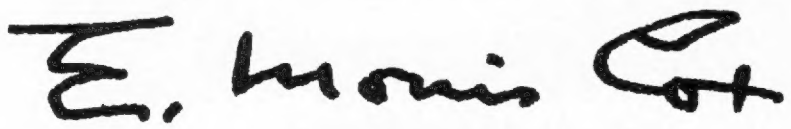
During the latter 19th century, the California Academy of Sciences developed as a regional natural science museum with its interests devoted mainly to biology, geology and botany. After the destruction of its collections in the earthquake and fire of 1906, the California Academy of Sciences moved to its present location in Golden Gate Park. Here a progression of generous gifts has provided a fine group of buildings — North American Hall, Steinhart Aquarium, Simson African Hall — and more recently, the Science Museum with Morrison Planetarium and Auditorium, the outstanding Mailliard Library, the Lovell White Hall and, under construction now, beautiful Cowell Hall. During this century, the Academy has built up a modest and essential endowment from the gifts of many devoted friends.

With its excellent facilities and direction, the Academy has attracted a group of dedicated and qualified scientists over the years. Because it has developed into one of the nation's few great natural science museums, it has been the continuous recipient of important collections. We realize that the primary function of a natural science museum is in collection, preservation and research. With these fundamentals carried on with competence and dedication, the Bay Area is provided with great educational advantages. These bring visual pleasure and entertainment for casual visitors, inspiration to young school students and outstanding research facilities for both college students and university graduate students working on advanced degrees.

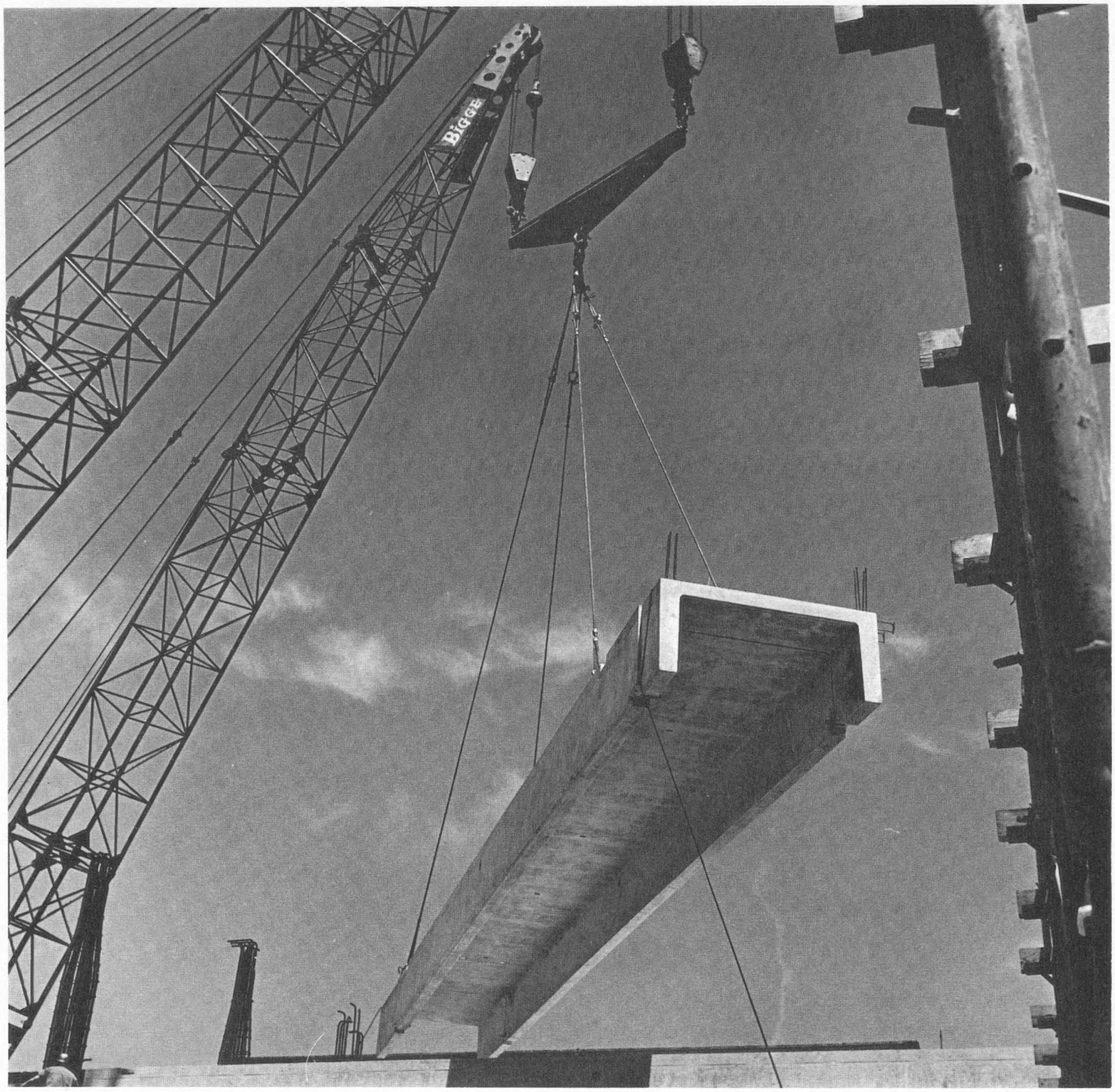
The intense and fast developments in space science, atomic physics and molecular biology concentrated in our universities are placing new and increasing pressures on the great natural science museums of the nation to expand their facilities. Increasingly, important collections are making their way to us. We have had long relationships with Stanford and the University of California, with members of their science faculties serving as Trustees of the Academy. David Starr Jordan, while serving as president of Stanford (1891-1913), was also president of the California Academy of Sciences. In recent years our affiliation with the University of San Francisco and San Francisco State College has been formalized. The Academy's role in research and in teaching is expanding rapidly.

A major development study has just been completed to aid us in planning for the coming decade. As we develop in the last third of the century, great and imaginative efforts will be needed for us to expand and improve. The Academy is one of the great natural science museums of the world. Its scientific achievements, which are unknown to the general public, give it a world-wide reputation for excellence in its field. The Trustees are increasingly aware of the needs and potentials of the Academy.

We are appreciative and give thanks to our friends — the City and County of San Francisco, corporations, foundations and individuals — for increased financial support this past year. And we look forward to the next decade as one of development and achievement.



E. MORRIS COX
Chairman, Board of Trustees



REPORT OF THE DIRECTOR

GIANT cranes positioning thirty-seven ton girders to span the spacious loggia of Cowell Hall; the pounding of jack-hammers biting into concrete as a prelude to the expansion and refinement of a research department; quiet and lonely camps of Academy scientists in the Namib Desert of South West Africa; dolphins playing before crowds of delighted visitors; these were scenes of the 1967-1968 year, the 115th in the history of the California Academy of Sciences. It was marked by progress and accomplishment.

The most tangible evidence of Academy progress was magnificent Cowell Hall, a gift from the S. H. Cowell Foundation, which began to rise during the year. This fine building will unite the Academy complex into a single unit, provide new exhibit space, administrative offices and areas, an attractive restaurant and other creature comfort facilities for visitors, as well as an enclosed, artistically landscaped courtyard. Construction started in September 1967 and will be completed in April 1969.

Some of the accomplishments of the year were less obvious. For example, the Department of Ichthyology was reconstructed and restructured, with the help of a $177,600 grant from the National Science Foundation, to incorporate the George Vanderbilt fish collection of Stanford University with that of the Academy, making ours a world center for systematic ichthyology.

The Board of Trustees, under the leadership of Chairman E. Morris Cox, gave increasing attention to the long-range development and future needs of the Academy. Outstanding community leaders, Messrs. Philip S. Boone, Peter E. Haas, and Jerome W. Hull, accepted positions on the Board of Trustees with full understanding of the demands and responsibilities of their commitment. An in-depth survey of the strengths, public image, and funding potential of the Academy was conducted by the Robert Johnston Corporation, as a result of which arrangements were made for Mr. Michael J. Kearney to join the staff as

Associate Director for Development on July 1, 1968. Possibly the most important achievement of the report year was an increased recognition and concern for the proper support of essential improvement of the Academy, and a determination that those needs will be met.

HIGHLIGHTS

The Annual Meeting was held October 4, 1967. All members received invitations, and their personal guests were welcomed, but no general public announcement was published. This new system had the desired effect of fuller participation by the membership. A business meeting in Morrison Auditorium was followed by open house tours of research and exhibit departments, and refreshments in Steinhart Aquarium.

On October 16, Mr. E. Morris Cox was elected Chairman of the Board of Trustees, succeeding Mr. Alan J. Galloway who held the important position for the two preceding years.

A reception honoring new members was held in Steinhart Aquarium on October 27. Mrs. Joseph C. Fennelly was hostess, assisted by Mrs. Joseph A. Moore, Jr., Membership Chairman for the Board of Trustees, and Miss Sue Weaver, Membership Coordinator on the Academy staff.

The Annual Banquet of the Fellows of the California Academy of Sciences was held on Wednesday evening, November 1. A social hour in Steinhart Aquarium was followed by dinner in Simson African Hall. Dr. G Dallas Hanna, Curator of Geology, was awarded the Fellows' Medal, the most distinguished recognition of scientific achievement the Academy can bestow. Dr. Nicholas T. Mirov addressed the Fellows on the subject "Russia Revisited After Fifty Years."

Above, Academy President J. Wyatt Durham presented the Fellows' Medal to Dr. G Dallas Hanna (center) while Director Lindsay looked on. Right, the construction of Cowell Hall was tangible evidence of Academy progress during the 1967-1968 year.

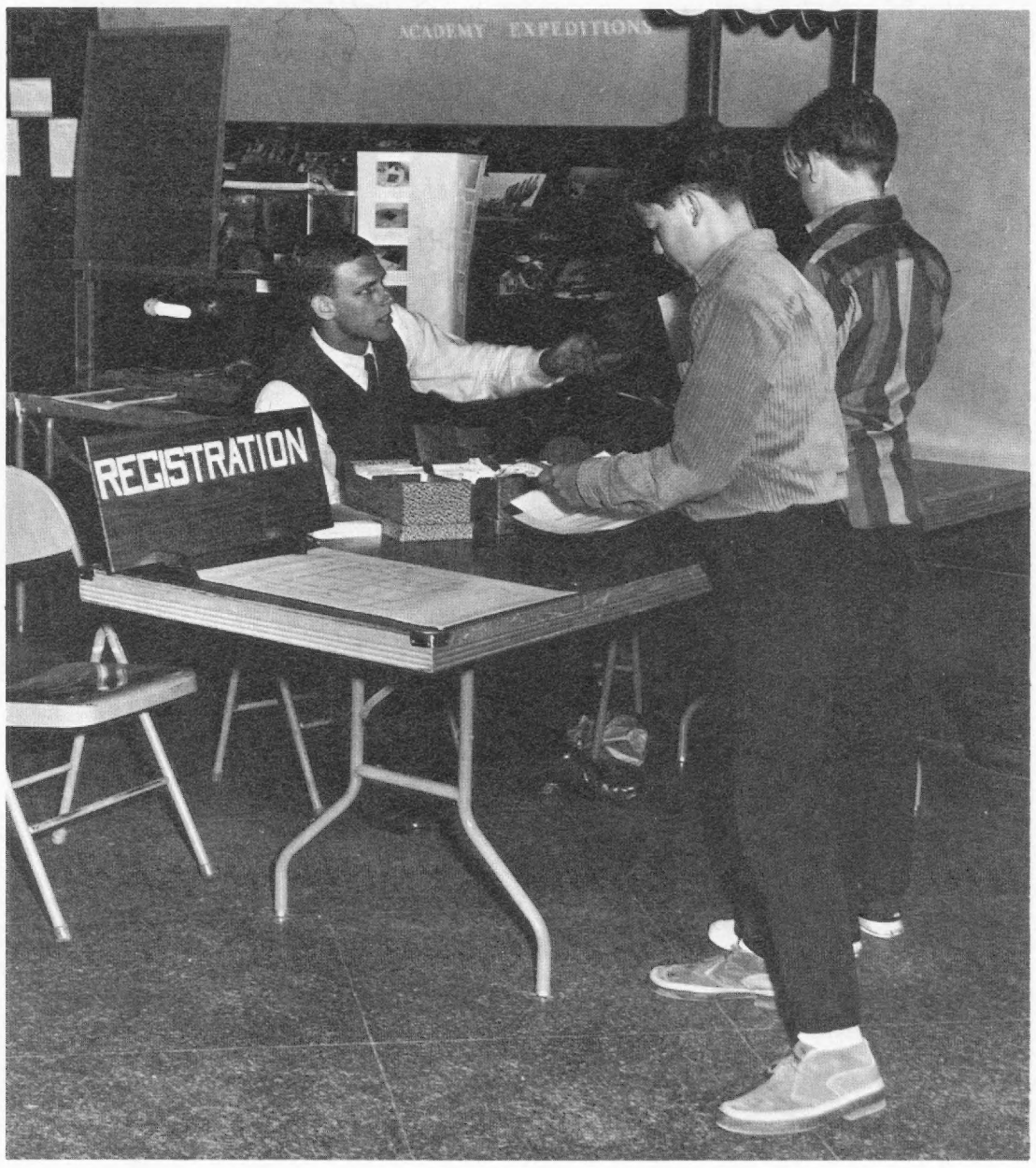
The Department of Ichthyology was reconstructed and modernized, and the George Vanderbilt fish collection was added.

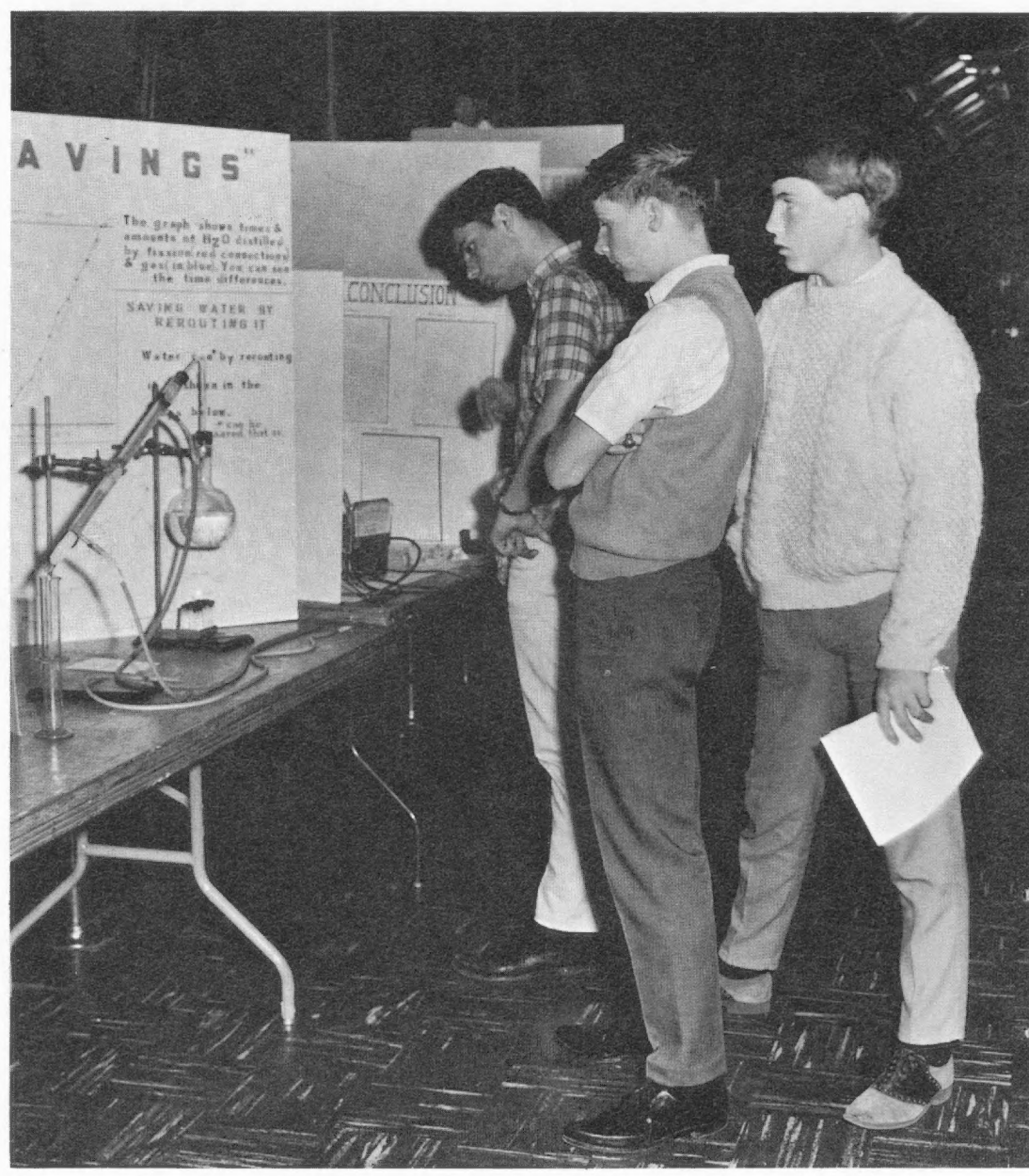
The 15th Annual San Francisco Bay Area Science Fair was held March 25-April 3, and was viewed by 38,611 visitors. Some 300 finalists of competitions among more than 5000 young people exhibited their research projects. Awards to the winners were presented in Morrison Auditorium on March 27 and 28.

FIELD WORK AND EXPEDITIONS

Field exploration for new knowledge about our planet and its biota was continued through the year. All of the research departments carried on such investigations, particularly as related to the fauna and flora of California and the western United States.

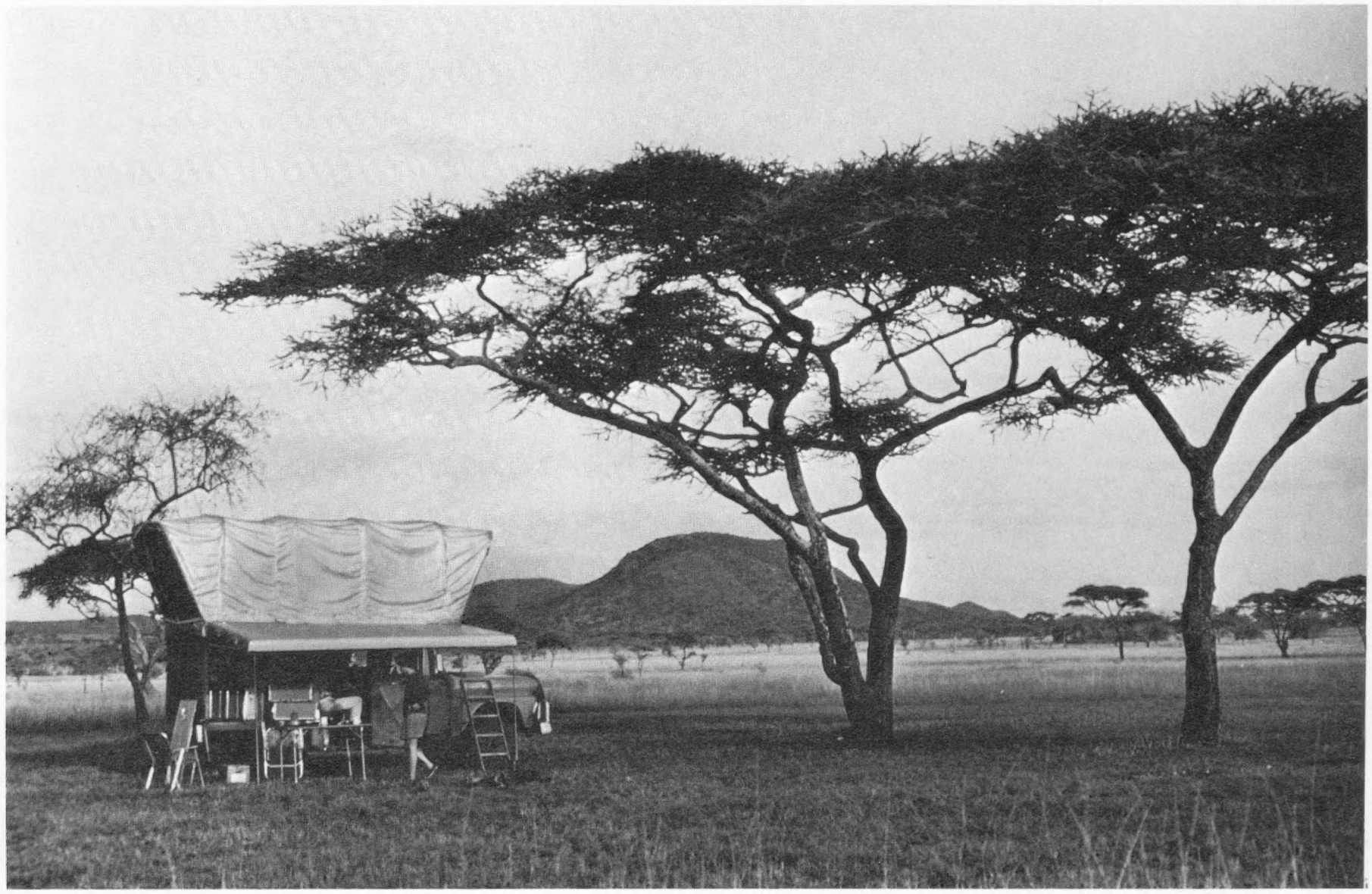
Dr. Edward S. Ross returned to South Africa to pick up his expedition truck in Cape Town, then drove to Nairobi, Kenya, via the Namib and Kalahari deserts. The safari party, which had partial sponsorship by the National Geo-





The San Francisco Bay Area Science Fair was held at the Academy for the fifteenth consecutive year. Some 300 junior scientists exhibited their research projects.

Academy groups continued their natural history investigations in such remote areas as the Gulf of California and East Africa.



graphic Society, included Allan Stephen of San Jose State College, Carol McMillan of the Entomology Department, Martha Ross, and H. Vannoy Davis, who joined the group in South West Africa and Botswana. The expedition ended at Nairobi on December 7. On April 17, Dr. Ross described his African field work in a lecture to the members entitled "The Many Africas of the Naturalist."

Baja California and the Gulf of California attracted several Academy groups. One Aquarium trip for underwater photography and living specimens utilized the diving vessel *Marisla* owned by Richard Adcock of La Paz from August 19-26, another, Mr. Ed Janss' yacht the *Cuckoo's Nest.* Other biologists visited islands in the north central Gulf of California using the *San Agustin II* of Bahia de los Angeles.

On May 1, 1968, the National Science Foundation granted $19,000 to the Academy for a two-year study of the scorpion fauna of Baja California by Dr. Stanley C. Williams. Dr. Williams and his assistant departed in June for three months of field work and will return for additional collecting in the summer of 1969.

STEINHART AQUARIUM

Steinhart Aquarium is the most popular department of the Academy, and under the able and imaginative leadership of Associate Director Earl S. Herald, it continued to present the most attractive displays of fish to be seen in any of the world's great aquaria. It is the only major aquarium with free admission, thanks to support provided by the City and County of San Francisco with additional help from generous individuals and organizations. Dr. Herald and his staff are to be congratulated for the quality and popularity of Steinhart Aquarium.

More than 20,000 living fishes and other vertebrates were received by the aquarium during the year, the majority of which were collected by Walter Schneebeli and other staff members and associates. Some 715 specimens were gifts, 561 were provided by other institutions, and 1343 were purchased.

The most outstanding new display was an Amazon manatee sponsored by Academy Trustee Wilson Meyer and Patron Maurice Rakowicz. This friendly sea cow consumes at least 25 heads of crisp lettuce daily, and in six months its weight increased from 64 to 146 pounds. The animal had a deep harpoon wound when it arrived from South America but Veterinarian Fred Frye was able to cure the resulting severe osteomyelitis. The manatee is now healthy and apparently happy. At no time, however, did it lose its appetite.

With the sponsorship of United Airlines, a new display of Hawaiian butterfly fishes has been developed. Some 75 specimens representing six species of these colorful fishes now dazzle the visitors to tank #13.

But Steinhart Aquarium is not only an attraction for tourists and other visitors; it also has a research function and program. Dr. Herald is currently serving as principal investigator for four projects: a field study of the blind Gangetic dolphin for the U.S. Navy; plasma proteins of elasmobranch fishes (with Dr. Alan Leviton and Dr. Ben Papermaster) for the Office of Naval Research; ultraviolet sterilization of aquarium water (with Robert Dempster and Marjorie Hunt) for the U.S. Fish and Wildlife Service; and the Vanderbilt program with support from the National Science Foundation. Aquarium facilities are frequently used by visiting investigators, and aquarium personnel serves as information sources for questioners who range from a child with a sick goldfish to employees of governmental departments responsible for major research projects and activities.

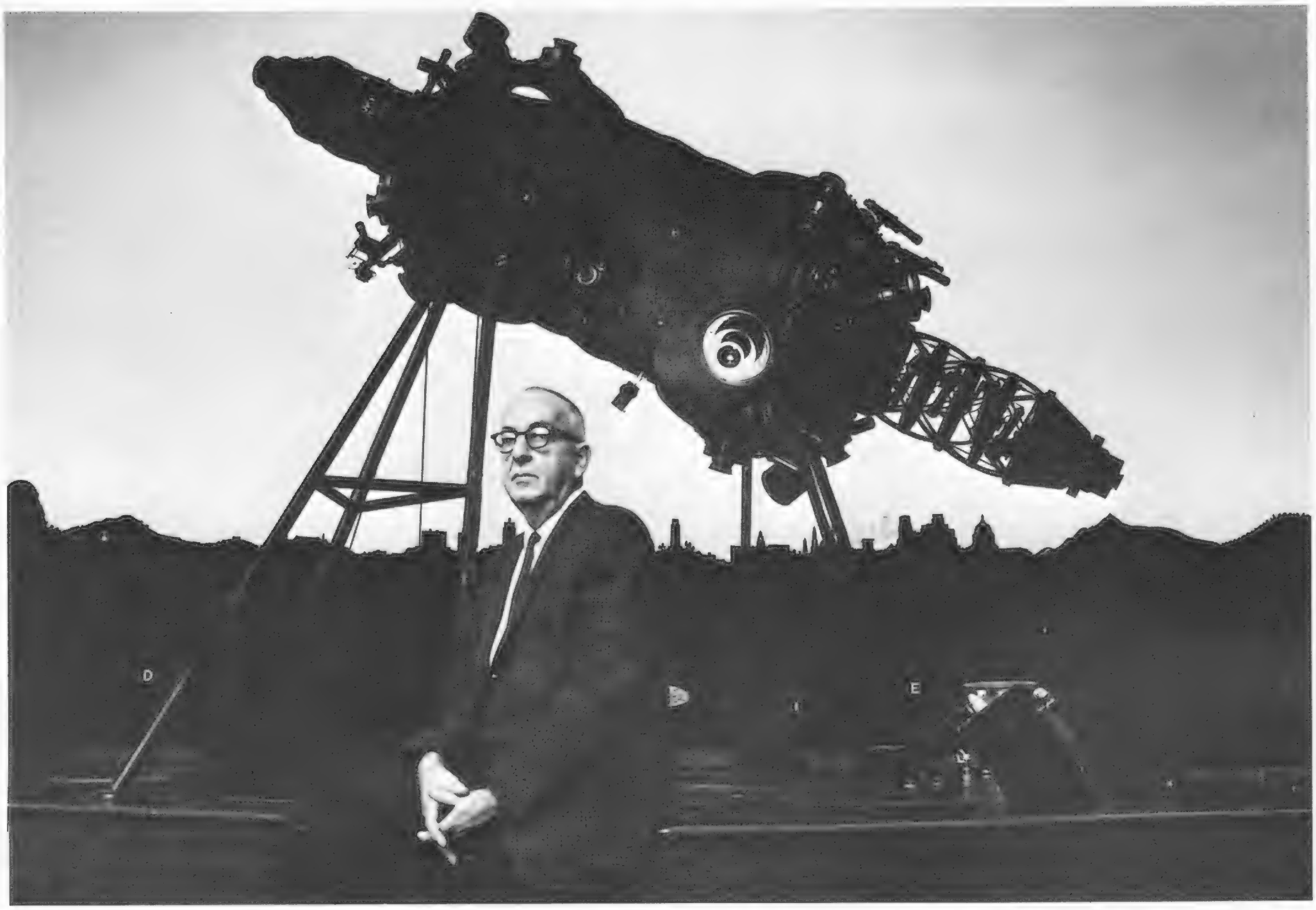
DOLPHIN
SOUNDS

MORRISON PLANETARIUM

Captain Robert D. Risser, U.S.N. (Ret.), Supervisor. The Alexander F. Morrison Planetarium presented 876 public programs which were attended by 120,880, and 158 special educational programs for 53,269 students, or 1034 programs attended by a total of 174,159 persons. In addition, 207 enrolled for 16 two-hour classes in "Celestial Navigation" presented by Capt. David W. Todd, Jr., U.S.N. (Ret.); 80 for the "Observational Astronomy" course offered by Ronald Daher; and 66 for "Astronomy for Fun" taught by Capt. Risser.

This was the 16th year for Morrison Planetarium, a fact which makes it one of the more venerable members of the major planetaria family, and though its programs and equipment have long set standards of excellence in the planetarium world, there are signs of wear and fatigue from the well over one million audience hours.

Captain Risser, who joined our staff on September 1, 1967 after serving as Director of the Kirkpatrick Planetarium in Oklahoma City, has already made great improvements in the organization and management of Morrison. With Chief Technician Steven B. Craig and Assistant Superintendent Chance Massaro, he initiated a program for renovating the seats and floors and much of the projection and sound equipment without missing a scheduled performance. Looking to the future, he has recommended a major remodeling and overhaul in 1977, using ideas and equipment some of which have not yet been invented. In the meantime stronger educational use of Morrison Planetarium is proposed, with a formal affiliation with the Astronomy Department of neighboring colleges. It is probable that a course in planetarium operation and management will be taught at the Academy in the near future, to help train personnel to operate the great number of new planetarium installations which are completed each year.



Captain Robert D. Risser, U.S.N. (Ret.), Supervisor of Morrison Planetarium.
Behind him is the Academy-built planetarium projector.

JUNIOR ACADEMY

Ken Lucas, Supervisor, and Darrel McKenzie, Instructor. The California Junior Academy of Sciences is the center for nearly 300 youngsters from 10 to 21 years of age who are actively exploring their natural world. Many of them will later go into careers in biology, medicine, or one of the related sciences. Many will not, but it is certain that all will retain (as a result of their Junior Academy experience) an appreciation and understanding of natural history which will make their adult lives more inclusive.

There are two divisions in the Junior Academy. The "Junior" group, age 10-15, has formal sessions during a two-month summer course, and Saturday classes during the school year. They take local one-day field trips in chartered buses. The "Senior" group, age 16-21, pursued its own research interest and projects with the Academy providing space, equipment, and encouragement whenever possible. There are no formal classes for the older group, but seminars and monthly evening meetings provide opportunity for stimulating exchanges of ideas and planning for field trips and activities.

Classes for Juniors are so large they can no longer be accommodated in the Junior Academy classroom, so they meet in Morrison Auditorium. Senior members assisted on the field trips (which sometimes involved more than one hundred youngsters) and with some of the classwork. Individual guidance was often provided in specialized subjects by the Seniors.

Field trips for Seniors went to Oregon, Nevada, and Arizona. Materials collected included specimens for individual study as well as for the study collection which has been built and maintained by student members. Mr. I. W. Hellman provided funds for a four-wheel-drive "Camper" which will serve as headquarters for various future field projects, in which groups of eight or ten Senior members will undertake a field problem under the direction of an Academy scientist. The American Association for the Advancement of Science granted $1,000 to help sponsor the projects which will start in late summer of 1968. Results of the studies will be published in the Junior Academy's *Student Discovery*.

The Junior Academy also serves as an information center, answering the questions of the puzzled public and identifying the specimens they bring in. Mr. Lucas cooperates with science teachers, school biology clubs, the Boy Scouts and similar organizations. Merit badge tests are given, specimens are loaned, and tours are conducted under his direction.

J. W. MAILLIARD, JR. LIBRARY

Ray Brian, Librarian. The J. W. Mailliard, Jr. Library is devoted to biosystematics and supporting subjects. It is the central library of the Academy complex and services the specialized holdings of each of the eight department libraries. The combined libraries have approximately 71,000 volumes, and some 2300 periodical and other serial titles are received annually. It is a reference library, open to members and serious researchers, and materials from it can be obtained through inter-library loans. It is a research resource for the entire scientific community, with heavy direct use by undergraduate and graduate students from neighboring colleges and universities.

The library is not adequately staffed to render the level of service we would like to provide. Without the regular and faithful help of several generous Library Associates and volunteers, including Julian Arntz, Margaret W. Campbell, Anson Herrick, Paul H. Anderson, and Jessie Saunders, the limited staff would have been hard put to keep up with the regular work. Important assistance was also provided by students of the University of California and San Francisco State College, who, during the year, worked 2053 hours under the Work Study Program of the Economic Opportunity Act of 1964.

The average cost of a book was $11.07, about one dollar more than the preceding year, and the average cost of binding a volume advanced from $4.43 to $5.86. In addition to budgeted purchases, materials were received through exchange arrangements with 481 foreign and 64 domestic institutions.

The important conchological library of Ruth E. Coats, with many rare and classic books, was received through her bequest, and the Cornelia Covington Pringle Collection was added following her death. Mrs. Edward Hohfeld presented

Library Associates Margaret W. Campbell and Julian Arntz were among the volunteers who regularly contributed their valuable services.

a miscellaneous collection of 94 books of a general nature, and rare botanical works were acquired through a botanical book purchase fund which Mrs. Hohfeld established in 1967 in honor of John Thomas Howell. Mr. Paul Anderson again made major gifts to the library, as did Mills College and many other donors.

PICTURE COLLECTION

Johan Kooy, Chairman. During the year more than 100,000 new items were entered into the swelling files and cabinets of the Picture Collection, which house nearly one-half million illustrations and photographs. During the year, 4817 illustrations were loaned for research, publication, and lecture purposes. Ten volunteers now work in the department in addition to Chairman Kooy and Associates Paul Anderson and Muriel French.

Important gifts during the year include many fine astronomical, botanical, and zoological prints from Mr. Anderson, and substantial material assistance was provided by Mr. Anderson, Mrs. Somers Peterson, and the Frank A. Campini Foundation.

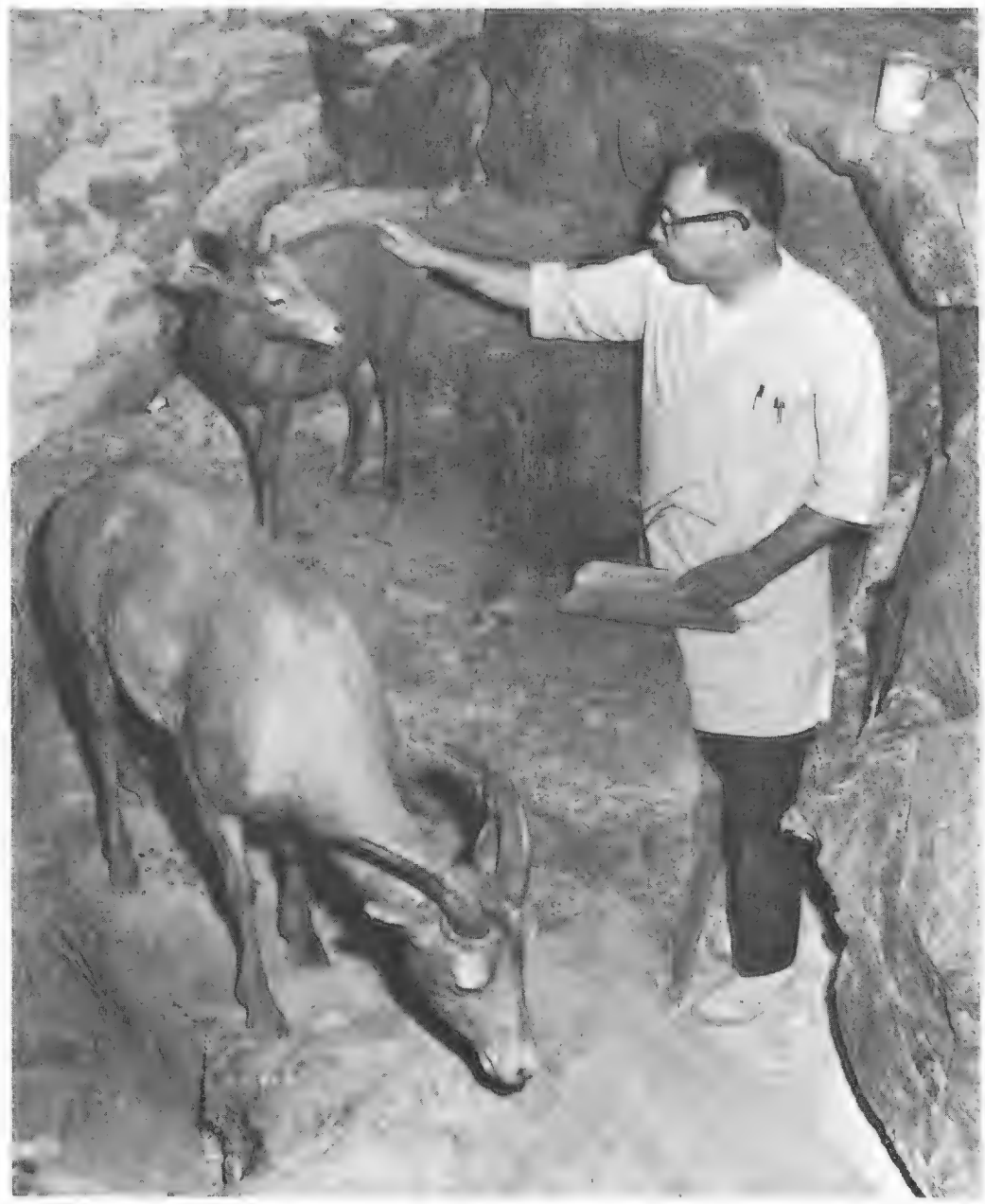
The Picture Collection is largely staffed by volunteers. Mr. Anderson is in charge of the Reference Collection and Miss French of the Botanical Slide Collection. Miss Lilian McHoul works with botanical prints, Mrs. Olive Philipson with copyright-free material, Mrs. Doris Ketcham files plant illustrations, and Mrs. Eva de Becker devotes her attention to ornithological subjects. Other faithful volunteers who work in specialized areas are Mrs. Dorcas Whitehead—mammals, Mrs. Marian Boede—reference, Mrs. Marilyn Blaisdell—Academy history, Mrs. Audrey Miller—portraits, Mrs. Georgia Paine—geology, and Mrs. Audrey Endress—assistance to the Reference Collection.

The Picture Collection has expanded beyond the capacity of its present quarters, and a larger facility, with additional storage and work areas, is planned for the coming year.

PACIFIC DISCOVERY

Bruce Finson, Editor, and Johan Kooy, Art Director. *Pacific Discovery,* a bimonthly journal of nature and man, is produced for the members of the Academy. Its popular articles are about the natural world and its inhabitants. On occasion, a whole issue is devoted to one general subject. For example, Mexico was the theme of one number. There was an editorial about wildlife management there written by Dr. Hernandez Corzo, Director General of Wildlife; a story about the Academy's "Oaxaca Project" in the Sierra de Miahuatlan by Robert T. Orr; a description of the Museum of Natural History of the City of Mexico by its director, Alfredo Barrera; a picture story about the Lacandons by Marion Patterson; an article about the Mexican Echeverias by Reid Moran; one about the ancient Mayas by Stephen F. de Borhegyi; a picture story of an ocelot by Willis Peterson, and a concluding article, "Grizzlies of the Sierra del Nido" by A. Starker Leopold.

The members of the Editorial Board, Bruce Finson, Johan Kooy, Robert I. Bowman, George E. Lindsay, Robert C. Miller, and Robert T. Orr, read all manuscripts submitted and select, by vote, those which are used in the magazine. Every issue contains articles about Academy activities or by Academy authors, and Hal Richardson's popular column "Academically Speaking," which is usually concerned with local personalities or events. *Pacific Discovery* is a quality publication in which we take pride.



EXHIBITS

Mearl F. Carson, Chairman and Curator. Museums display objects, and it is the quality of those objects, and the techniques of their display, which determine the effectiveness of any museum. The great popularity of the Academy's museum is not a thing to be taken for granted. Rather, the fact that millions of visitors come every year carries an obligation to make their investment of time as profitable as possible in pleasure and education. The exhibits must be improved in concept and execution.

During the year, major emphasis was on the completion of the new Hall of Minerals. A geology section was developed around eight new exhibit features which demonstrate the forces and processes which give the earth its physiography. A six-foot model was constructed of fiberglass to show the structure of our planet from core to crust. An animated model shows the action of eathquakes. A cutaway section answers questions about volcanoes. Exhibits show the kinds of rock found in the San Francisco Bay region and how they were formed. The relationship of rocks and minerals is explained.

The systematic mineral collection includes 509 specimens arranged according to class in 90 feet of display area. These valuable specimens are mostly from the famous M. Vonsen collection augmented with recent gifts from Mr. Lewis K. Land and others. A fluorescent mineral display was installed between the geology section and systematic mineral collection.

The North American wing was completed in 1916 and was beginning to show its age. But many of the 50-year-old dioramas are excellent and in fact could not be replaced today. The ceilings of the North American Hall of Birds and the North American Hall of Mammals were painted. Valances to reduce the glass area of the huge dioramas were installed. Some of the mounted animals which had faded through exposure to natural light were refurbished. The whole appearance of these historic halls and their fine dioramas was greatly improved.

Mrs. Edward Hohfeld provided a contribution of $54,600 for the construction and maintenance of the Edward Hohfeld Hall of Space Science in the Science Museum. James Robertson Associates were retained to develop exhibit plans for the new hall relating them to proposed improvements in other sections of the museum. A model of the moon and other exhibit features have been purchased and the Hall of Space Science will be completed in 1968.

Many temporary exhibits were prepared, the most beautiful being a collection of color photographs, "A Walk Through the Redwoods," by Mr. Howard King which were on display in Lovell White Hall.

Mr. Bruce A. Kock, Honorary Curator of Horology, continued his responsibility for the William Barclay Stevens

collection of timekeeping devices. Acquisitions for the horological exhibit included two American-made tower clocks of the mid-19th century, as well as several watches. Mr. Kock also answered many public inquiries about watches and clocks and identified horological items.

The Carpenter Shop, with Konstantin Kurkin, the cabinetmaker, in charge, was placed under the general jurisdiction of the Curator of Exhibits. The shop produced display cases and facilities for public exhibits and specimen cases for the research departments, in addition to cabinet work throughout the institution.

INSTRUMENT SHOP

Alvin C. Gundred, Superintendent. The Shop designs and constructs special equipment for Morrison Planetarium and performs mechanical-electrical maintenance functions for all Academy departments. On an as-available basis, the shop produces duplicates of our specialized planetarium projectors and exhibits (which are not available from normal commercial sources) for other non-profit institutions.

This year, Foucault pendulums were designed and installed in the Indiana State Museum in Indianapolis, in three State Colleges in Pennsylvania—Edinboro, Clarion, Kutztown—and in the Museum of Natural History in Denver, Colorado. Also, specialized planetarium projectors were furnished to the Royal Ontario Museum and the City of Vancouver McMillan Planetarium—both in Canada, the Hayden Planetarium of the American Museum of Natural History in New York, and the Seattle School District's Pacific Science Center in Washington.

PUBLIC INFORMATION

Hal Richardson, Public Information Officer. The Academy, with its wide variety of activities, is of interest not only to the local populace but on occasion to the rest of the United States. Some 280 different organizations receive news releases about our new acquisitions, exhibits, special programs, scientific meetings, and other events. The newspapers, radio stations, television stations and wire services are more than generous in keeping the Academy's name before the public, and here once again presents an opportunity to express our appreciation for their support.

Locally, the various media publicized, in particular, our outstanding planetarium shows, the beginnings of Cowell Hall, and the reception for new members.

Mr. Richardson, a "one man office," also writes and edits the Academy *Newsletter,* contributes the column "Academically Speaking" to *Pacific Discovery,* arranges the programs for the monthly membership meetings, receives distinguished guests from here and abroad, and oversees such special events as the Annual Meeting and Open House and the Fellows' Banquet.

RESEARCH ACTIVITIES

The California Academy of Sciences is one of the 23 major institutions in the United States which possesses collections of biological materials so important they are designated as national facilities. It is one of the half-dozen most important research museums in the United States. It is a center for exploration and interpretation of natural science and the guardian of a vast collection of scientific specimens.

The research program and activities of the Academy are under the general supervision of the Science Council, a standing committee of Trustees and professional staff members. The President of the Academy serves as Chairman of the Council.

The members of the Science Council were J. Wyatt Durham, *Chairman;* Paul H. Arnaud, Jr., Ian Campbell, Ralph Emerson, Earl S. Herald, A. Starker Leopold, Alan E. Leviton, Robert T. Orr and Thomas Tilton; and George E. Lindsay, *ex-officio*.

BOTANY

John Thomas Howell, Chairman and Curator. About 10,400 plant specimens were added to the herbarium during the year, to give the total of 474,843. It is a rich collection, especially of the California flora, and it contains about 1500 invaluable holotype specimens. The herbarium serves to document the flora of the state and is particularly valuable for its representation of partly extinct floras of such areas as San Francisco and Santa Barbara. The department has served as a focus for the compilation of local floras and is a center for the identification and study of ornamental plants, especially those of the Pacific Coast.

In addition to field work and floristic studies, Mr. Howell and Miss Anita Noldeke completed a cumulative index to "Leaflets of Western Botany." The 172-page book, a fitting finale to one of the department's chief contributions to botany for three and one-half decades, was published with the financial help of the Academy, the California Botanical Club, and a number of friends. Mr. Howell also completed

John Thomas Howell, Anita Noldeke, and Javier Peñalosa are shown processing some of the 10,400 plant specimens added to the herbarium during the year.

editorial work on the manuscript monograph of the genus *Echeveria* by the late Eric Walther.

Dr. Elizabeth McClintock and Walter Knight completed a flora of San Bruno Mountain which is now in press, and Dr. McClintock also concluded her research project on the taxonomy of ornamentals being done in cooperation with the Bailey Hortorium of Cornell University in preparation of "Hortus Third."

During the year, 3273 specimens were loaned to other workers. Beside their curatorial duties and frequently beyond the limits of regular hours, Mr. Howell and Dr. McClintock gave professional help and direction to local botanical, horticultural, and conservation groups. Mr. Howell led about forty meetings of the California Botanical Club which has been associated with the Academy since its founding in 1891. Dr. McClintock continued the close cooperation between the Academy and the Strybing Arboretum, served as Botanical Editor of the California Horticultural Society Journal, and continued her active interest in conservation matters and Chairmanship of the Academy Conservation Committee.

A large staff of volunteers gave invaluable service. Lewis S. Rose has worked regular hours for more than thirty years, and more than a dozen others made important contributions to the accomplishments of the department.

Kathy Rentz selecting field specimens of insects for study and eventual incorporation into the research collections.

ENTOMOLOGY

Paul H. Arnaud, Jr., Chairman and Associate Curator. The entomological collections include more than 3,660,000 fully-processed specimens. During the year, 224,051 were accessioned, and 68,482 were loaned to researchers in other institutions. Dr. Edward S. Ross gave his collection of 131,000 specimens of Embioptera, and 10,308 specimens and slides of Ephemeroptera were from the late W. C. Day. Mr. Don Patterson, who is interested in the butterfly fauna of Baja California, donated a collection from that area and sponsored the spreading and labeling of some 750 butterflies and moths. Paul S. Bartholomew gave 21,965 beetles as well as volunteer service in processing them. In all, more than 125 individuals and institutions contributed 204,448 specimens.

Dr. Arnaud was appointed Chairman of the Department effective April 1, 1968, relieving Dr. Ross of administrative responsibilities to facilitate his research on Embioptera, field work, and educational activities. During the year Dr. Arnaud devoted half of his time to the production of a host catalog of North American Tachinidae, with the sponsorship of the United States Department of Agriculture. Dr. Edward L. Kessel continued his work on the taxonomy and biology of flat-footed flies (Platypezidae). Mr. Hugh B. Leech carried on investigations on the taxonomy of Nearctic water beetles in addition to the enormous task of caring for the beetle collection and preparing 40,458 specimens for shipment to borrowers and putting them away upon their return. Dr. Ross went to Africa in mid-August 1967, conducted a safari from Cape Town to Nairobi, via the Kalahari Desert, and returned in late December.

The public service provided by the Department of Entomology is impressive. There were 826 different visitors during the year, many of whom were professional entomologists. They came from the United States and 18 foreign countries. All of these required the attention of the staff and many had specific research problems which required the use of the collections.

Of the 68,482 specimens loaned during the year, 7581 went to private individuals and 60,901 to research students at 57 different institutions. Shipments were sent to 13 countries in 237 separate transactions, and to a total of 171 persons, most of them graduate students at universities.

The loss by death of Mr. John W. Green, a preparator in the department for many years, was a cause for sorrow among his co-workers.

Fourteen volunteers contributed their valuable services to the department during the year, and their help was indeed important.

Left, Dr. G Dallas Hanna, a world authority on fossil diatoms. Below, Dr. Victor A. Zullo, who joined the staff as Associate Curator of Geology.

GEOLOGY

G Dallas Hanna, Chairman and Curator. The Department of Geology collections contain more than 31,000 lots or 2,000,000 specimens of invertebrate fossils, and 10,000 lots of Recent shells. It also has a world-wide collection of fossil diatoms mounted on more than 20,000 slides, as well as significant collections of foraminifera and silicoflagellates. In addition there is an important collection of 8500 mineral specimens, housed in a separate area under the supervision of Honorary Curator Charles W. Chesterman.

Dr. Victor A. Zullo joined the staff as Associate Curator on September 1, 1967. He came from the Marine Biological Laboratory at Woods Hole where he was Assistant Director and Resident Systematist for the Systematics-Ecology Program. He is a specialist in barnacles and marine zoogeography.

During the year, work on the Recent mollusk collections was emphasized and several large private collections were accessioned. Large series of duplicates were given to the Museum of Paleontology, University of California, Berkeley; the Colorado School of Mines; American Museum of Natural History; Santa Barbara Natural History Museum; and the Fresno Museum.

Dr. Hanna in cooperation with Dr. A. L. Brigger continued work on Eocene diatoms from deep Atlantic cores. Dr. Hertlein continued his investigation of the Pelecypoda of the Pliocene San Diego Formation and also on Fossil and Recent shells from the Galápagos Islands.

Dr. Zullo assumed an increasing portion of the administrative responsibility for the Department, in addition to his curatorial work and research on barnacles and other invertebrate organisms, fossil and Recent.

HERPETOLOGY

Alan E. Leviton, Chairman and Curator. The herpetology collections contain about 65,000 amphibians and 125,000 reptiles and are particularly rich in material from Asia, Australia, the Galápagos Islands and Central America,

Above, Maud Pearson studies shark blood plasma to determine possible systematic relationships of those fishes. Below, Dr. Steven C. Anderson examines living reptiles used in investigations conducted in the Department of Herpetology.

in addition to Baja California and western North America. The Stanford University herpetology collection of about 60,000 specimens, which was transferred to the Academy during the year, is included in the above. The Academy's herpetology collection is now matched or exceeded by only about eight others in the world.

Curatorial work continued to center about collections from Asia and, to a lesser extent, Africa and South America. Thirty-one accessions were received resulting in the addition of 8827 specimens. Field Associates Erica and Richard Clark completed an extensive collecting expedition in Turkey and sent 940 specimens. Almost 5000 specimens were received from Mr. Fred Parker as the result of support of Parker's field work in cooperation with the Museum of Comparative Zoology. Dr. Malcolm Miller arranged for a synoptic collection from southeastern Kenya, and a small but important collection from South Africa added several genera and species not heretofore represented. Both Ted Papenfuss and Borys Malkin contributed substantial collections from the West Indies, and Malkin's 220 specimens from the interior of the Santa Marta Mountains of eastern Colombia were particularly significant.

The Department's research activities centered about Asia. Dr. Leviton completed two more papers on Philippine snakes, Dr. Steven C. Anderson, with Leviton, completed reports on the Clark collection of Afghanistan reptiles, on the William Street Expedition collection from Afghanistan, and drew up a preliminary outline for a general herpetology of that country. Dr. Malcolm Miller completed an extensive study on the structure of the inner ear of snakes and also pursued an investigation of their pancreas.

The research collections were used by local scientists for 54 visitor days, graduate students and upper division students 177 days, foreign scientists 30, and others 98. Dr. Leviton identified snakes from Viet Nam for the Navy, and reviewed pertinent sections of a new Armed Forces manual on venomous snakes. Specimens were loaned to 22 institutions in 41 transactions involving 906 specimens.

ICHTHYOLOGY

W. I. Follett, Chairman and Curator. The past year was the most productive in the history of the department. It saw the structural renovation of its physical facilities with the aid of a $177,600 grant from the National Science Foundation. Dr. Earl S. Herald was Principal Investigator and Dr. William Eschmeyer headed the project activities. Miss Pearl M. Sonoda, Senior Technical Assistant, formerly with the Field Museum of Natural History, joined the staff under the N.S.F. sponsorship, and several others, including Tomio Iwamoto, Gordon Richardson, Warren Freihofer, Melvin N. Moriguchi, Denis Sapiro, and Lydia Eschmeyer participated in the project. The Department was expanded from 6400 to 11,400 square feet; new offices, library, dark rooms, preparation rooms, and collection storage facilities were completed; and a large part of the George Vanderbilt collection of fishes was moved from Stanford University. Department Chairman W. I. Follett, Associate Curator Lillian J. Dempster, and Research Associate George S. Meyers also assisted with the project.

The Vanderbilt collection adds significantly to the Department's research assets and is the most extensive collection of Indo-Pacific tropical shallow-water fishes housed in an American museum. It includes 40,000 lots of specimens in bottles and 4500 large tank and vat specimens. Because of the increase in size and geographic representation of the combined collections, Dr. Eschmeyer supervised the inauguration of a new filing system suitable for housing a large world-wide collection. Besides the Vanderbilt fishes brought to the Academy, about 350 lots of specimens from other sources representing about 3600 specimens, were accessioned.

During the year, 41 loans were made to 36 individuals, of which 1195 lots of fishes were from the Vanderbilt collection and 181 lots were from the original Academy collection, for a total of about 9590 specimens. Help with identifications, taxonomic, nomenclatural, or faunal problems was given to more than 75 individuals and institutions.

Chairman Follett served as a member of the Board of Governors, Chairman of the Nomenclature Committee, and President-elect of the American Society of Ichthyologists and Herpetologists. He continued his work on ethnoichthyological and faunal projects and on the revision of the list of the fishes of California. He conducted 13 field trips to study the California fish fauna. Dr. Eschmeyer continued research on the systematics of scorpionfishes and clupeids. In May he

Dr. William N. Eschmeyer and Pearl M. Sonoda (above) and Lillian J. Dempster were involved with the expansion of the Ichthyology Department and the incorporation of the George Vanderbilt Foundation collection of fishes into the Academy's collection.

The Invertebrate Zoology Department houses valuable collections of marine, freshwater, and terrestrial invertebrate animals. Dustin C. Chivers and Allyn G. Smith, Department Chairman, are shown measuring an out-sized lobster.

spent two weeks working with Mr. Fred Berry on clupeids at the Tropical Atlantic Biological Laboratory in Miami, Florida, and also examined specimens in the U.S. National Museum and the Field Museum of Natural History.

Without question, this was the most productive year in the history of the Department, which now contains one of the great fish collections of the world and is one of the principal centers for research in systematic ichthyology.

INVERTEBRATE ZOOLOGY

Allyn G. Smith, Chairman and Associate Curator; Robert C. Miller, Curator. The Department, which was established in 1914, was reorganized in 1960 to accommodate rapidly expanding collections of Recent marine, freshwater and terrestrial invertebrate specimens. It has also become the center for the deposition of type specimens and other research materials which were formerly held in several university and private collections and were in danger of being scattered and lost. For example, the collections of Stanford University, Hopkins Marine Station, and the University of California, Berkeley, were transferred to the permanent Academy collection, which now contains 23,000 lots of wet specimens and 369 holotypes.

From September 1963 through September 1967 the major support for the Department and its modernization was from the National Science Foundation. The reorganization was completed during the grant period and the Academy resumed the full cost of the Department on October 1, 1967.

During the report year more than 2500 specimen lots were added to the Department's holdings and the immense task of processing the Stanford University collection was completed. Approximately 1500 specimen lots of Recent barnacles, donated by Dr. Victor A. Zullo, were processed by Mr. David A. Cobb. A well-prepared collection of Western Pacific invertebrates from the Vanderbilt collection was another noteworthy acquisition.

Since October 1967 the Department staff has been involved in qualitative analysis of benthic marine invertebrates collected in a comprehensive ecological survey of Bolinas Lagoon, under the direction of Dr. Joel F. Gustafson of San Francisco State College. It is hoped that a more thorough knowledge of the existing ecology of the Lagoon will lead to the best use of this important wildlife, scenic and recreational area.

The Academy's Associate Director Robert T. Orr (above) is also Chairman of the Department of Ornithology and Mammalogy. Right, Jacqueline Shonewald and Michael Garrett are shown preparing mammal specimens.

ORNITHOLOGY AND MAMMALOGY

Robert T. Orr, Chairman and Curator. The Department's collections house about 82,000 specimens of birds, including 139 primary type specimens; 19,100 mammal specimens with about 100 primary types; and 7000 sets of eggs. The bird collection is especially rich in Galápagos material, waterfowl, oceanic birds, and birds from western North America, southern Mexico, Panama, and Manchuria. The mammal collection, although not large, includes an outstanding representation of marine forms as well as excellent series of bats from North America and Africa. An important collection of mammals from southeastern Asia is presently being acquired. Some 12,000 birds and 4500 mammals are from the Stanford University collection.

During the report year the Department received 822 items comprising 182 specimens of birds, 639 specimens of mammals, and one set of eggs. Outstanding accessions included a collection of 217 mammals obtained in Oaxaca in the summer of 1967 by James Nee, 274 mammals obtained in the spring of 1968 by Dr. John R. Arnold and David Carlson, 126 mammals from Malaysia, representing 15 genera and 33 species or subspecies new to the Academy collections, obtained from Dr. Albert Beck, and a gift of 127 mounted birds from Mrs. B. C. Hochmuth of Lancaster, New York.

Mrs. Jacqueline Schonewald was responsible for most of the care of the collections and the cataloging of materials. She also coordinated the work of several volunteers in the Department, including Miss Madelaine Waddell, Miss Muriel French, Mrs. Joy Bailey Osborne, and Miss Bayard Hooper, all of whom gave generously of their time. Mr. Michael Garrett, a work-study program student from San Francisco State College, processed all of the material in the deep freezer, and also began installing the Stanford collection of mammals in new steel cases in the mammal room.

Field work continued on the Oaxaca Project, a study of the birds and mammals of the Sierra de Miahuatlan of southern Oaxaca. In the summer of 1967 James Nee returned from two months' collecting with J. Stewart Rowley. This was supported largely through a grant of $600 obtained from the American Association for the Advancement of Science and resulted in the acquisition of 217 mammal skins, skulls and skeletons.

The construction of Cowell Hall closed regular access to the Academy, but 2,407,424 visitors found their way through temporary entrances.

In the spring of 1968 an Academy grant of $600 was made to Dr. John R. Arnold, a Field Associate in the Department and Professor of Zoology at Sonoma State College, to continue mammal collecting in southern Oaxaca. Dr. Arnold and student David Carlson were in the field from the middle of February to the middle of May and returned with a collection of 274 mammal specimens. Dr. Arnold is working up this material for future publication.

Dr. Orr made two short trips in Baja California and the Gulf of California as a guest of Mr. Lawrence C. Kuebler of Chula Vista, California. He also made a number of field trips to secure specimens and habitat photographs of fungi, for the Academy herbarium. He continued his studies of the birds of Sierra de Miahuatlan, Oaxaca, and with Dr. J. Dan Webster published descriptions of three avian subspecies from that region. Three graduate students who worked under the supervision of Dr. Orr received their M.A. degrees from the University of San Francisco in June 1968 —Luis Baptista, Leonard Greene, and Richard Cavalli.

Dr. Orr, in addition to serving as Associate Director of the California Academy of Sciences, was President of the Cooper Ornithological Society, a Director of the American Society of Mammalogists, a Member of the Advisory Board of the Charles Darwin Foundation for the Galápagos Islands, and held chairs in several other scientific organizations.

SCIENTIFIC PUBLICATIONS

Edward L. Kessel, Editor. The publication of scientific papers was an original purpose of the Academy at the time of its founding in 1853. The world-wide reputation of the Academy is the result of its scientific publications during the 115-year history.

The total output of technical publications for the report year was 551 pages: 4 *Occasional Papers* with 33 pages, and 518 pages of *Proceedings*. In addition, much editorial time was given to the preparation of a monograph on the plant genus *Echeveria* by Eric Walther, and other scientific publications which are now in press.

The Technical Publications Committee, George E. Lindsay, Chairman, and Edward L. Kessel and Leo G. Hertlein, reviews all manuscrips submitted, and the opinions of specialists in the particular subject of a paper are usually solicited. The editorial staff consisted of Drs. Kessel and Hertlein, and Winifred O'Neill. Color plates for some of the publications were made and printed by Dr. and Mrs. G Dallas Hanna and Maurice Giles. Dr. Hanna, with Mr. Giles and Glen S. Hayden, prepared the plates for a paper on foraminifera by C. C. Church, and Mrs. Hanna made the drawings for those plates.

George E. Lindsay

GEORGE E. LINDSAY
Director

STAFF

(As of June 30, 1968)

George E. Lindsay, *Director*
Robert T. Orr, *Associate Director*
Earl S. Herald, *Associate Director for the Aquarium*
J. Byron Warner, *Business Manager*
Vashti F. Hawley, *Secretary*
Robert C. Miller, *Senior Scientist*

AQUATIC BIOLOGY (STEINHART AQUARIUM)

Earl S. Herald, *Associate Director for the Aquarium*
Robert P. Dempster, *Assistant Superintendent*
Glenn E. Burghardt, *Senior Aquatic Biologist*
Lloyd Gomez, *Aquatic Biologist*
Fred L. Jenne, *Aquatic Biologist*
Richard Shopen, *Aquatic Biologist*
Karl H. Switak, *Aquatic Biologist (herpetologist)*
Norval J. Green, *Senior Aquarist*
James V. Crew, *Aquarist*
John Dillon, *Aquarist*
Frederick W. Herms, *Aquarist*
W. Walter Schneebeli, *Aquatic Collector*
Willett J. Brown, *Aquarium Exhibits Preparator*
Phyllis J. Ensrud, *Secretary*
Maud Pearson, *Lab Technician*
Fredric L. Frye, *Research Associate*
Marjorie Hunt, *Research Associate*
John Mizelle, *Research Associate*
Ben W. Papermaster, *Research Associate*
William Shipman, *Research Associate*

ASTRONOMY (MORRISON PLANETARIUM)

Robert D. Risser, *Supervisor*
Chance Massaro, *Assistant Supervisor*
Steven B. Craig, *Chief Technician*
John H. Leonberger, *Assistant Technician*
Elizabeth Javens, *Secretary*
Richard Rodgers, *Assistant (part-time)*
David W. Todd, Jr., *Instructor*
Michael A. Bennett, *Lecturer*
Hubert J. Bernhard, *Lecturer*
Charles F. Hagar, *Lecturer*
Thomas McDonough, *Lecturer*
Jill Carson, *Cashier*
Anna Critchlow, *Cashier*
Marjorie Critchlow, *Cashier*
Dawn Klevesahl, *Cashier*
Joseph D. Tooker, *Head Usher and Projectionist*
Ingo Orlamunder, *Usher*
Scott Schiechl, *Usher*
Peter Wilde, *Usher*
Robert Yager, *Usher*
Clay P. Butler, *Research Associate*

BOTANY

John Thomas Howell, *Chairman and Curator*
Elizabeth McClintock, *Associate Curator*
Ira L. Wiggins, *Senior Research Botanist*
Virginia Moore, *Technical Assistant (part-time)*
Blanche Clear, *Assistant (part-time)*
Anita Noldeke, *Assistant (part-time)*
Sallie Norwall, *Assistant (part-time)*
Clare B. Hardham, *Research Associate*
Robert F. Hoover, *Research Associate*
Hans Leschke, *Research Associate*
Henry M. Pollard, *Research Associate*
Lewis S. Rose, *Research Associate*
Gordon H. True, *Research Associate*
Ernest C. Twisselmann, *Research Associate*
Beatrice F. Howitt, *Field Associate*

ENTOMOLOGY

Paul H. Arnaud, Jr., *Chairman and Associate Curator*
Edward S. Ross, *Curator*
Edward L. Kessel, *Associate Curator*
Hugh B. Leech, *Associate Curator*
John W. Green, *Scientific Assistant*
Richard P. Papp, *Scientific Assistant*
Stella E. Tatro, *Secretary-Preparator*
Ian A. Boussy, *Technician (part-time)*
Thomas W. Davies, *Technician (part-time)*
Joseph L. Fisher, *Technician (part-time)*
Leland Kenoyer, *Technician (part-time)*
Herman G. Real, *Technician (part-time)*
J. Linsley Gressitt, *Research Associate*
Hartford H. Keifer, *Research Associate*
E. Gorton Linsley, *Research Associate*
Cornelius B. Philip, *Research Associate*
Robert L. Usinger, *Research Associate*
Joseph Wilcox, *Research Associate*
Thomas S. Briggs, *Field Associate*
Carol McMillan, *Field Associate*
Allan Stephan, *Field Associate*

EXHIBITS

Mearl F. Carson, *Chairman and Curator*
Timothy J. O'Leary, *Assistant Curator*
Ernest R. Rook, *Artist*
Charles Dornbach, *Senior Assistant*
Konstantin Kurkin, *Cabinetmaker*
Fred Thompson, *Assistant Cabinetmaker*
Alberto A. Cacicedo, *Assistant*
Jean Pitts, *Assistant*

GEOLOGY

G Dallas Hanna, *Chairman and Curator of Geology*
Leo G. Hertlein, *Curator of Invertebrate Paleontology*
Victor A. Zullo, *Associate Curator*
David Cobb, *Assistant (part-time)*
Hugo Hawkins, *Assistant (part-time)*
Enid Cook, *Secretary (part-time)*
A. L. Brigger, *Research Associate*
Charles W. Chesterman, *Research Associate and Honorary Curator of Minerals*
Clifford C. Church, *Research Associate*
Alan J. Galloway, *Research Associate*
York T. Mandra, *Research Associate*

HERPETOLOGY

Alan E. Leviton, *Chairman and Curator*
Steven C. Anderson, *Associate Curator*
Betsey Hutchings, *Research Assistant (part-time)*

James Harvey, *Curatorial Assistant (part-time)*
Charlotte H. Dorsey, *Secretary (part-time)*
Benjamin H. Banta, *Research Associate*
Walter C. Brown, *Research Associate*
Harold Cogger, *Research Associate*
James R. Dixon, *Research Associate*
David L. Jameson, *Research Associate*
Malcolm R. Miller, *Research Associate*
George S. Myers, *Research Associate*
Lawrence W. Swan, *Research Associate*
Erica Clark, *Field Associate*
Richard J. Clark, *Field Associate*
John Gasperetti, *Field Associate*

HOROLOGY

Bruce A. Kock, *Honorary Curator*

ICHTHYOLOGY

W. I. Follett, *Chairman and Curator*
Earl S. Herald, *Curator*
Lillian J. Dempster, *Associate Curator*
William N. Eschmeyer, *Assistant Curator*
Pearl M. Sonoda, *Senior Technical Assistant*
Lydia Eschmeyer, *Assistant (part-time)*
Tomio Iwamoto, *Assistant (temporary)*
Melvin N. Moriguchi, *Assistant (part-time)*
Gordon L. Richardson, Jr., *Assistant*
Denis Sapiro, *Assistant (part-time)*
Anatole S. Loukashkin, *Research Biologist*

INSTRUMENT SHOP

Alvin C. Gundred, *Superintendent*
Frank K. Talbert, *Machinist*
Peter P. Tebneff, *Chief Installer*
Frank Ramirez, *Electrician*
Uldarico Gontenas, *Assistant Installer*

INVERTEBRATE ZOOLOGY

Robert C. Miller, *Curator*
Allyn G. Smith, *Associate Curator*
Dustin D. Chivers, *Assistant Curator*
David A. Cobb, *Technical Assistant (part-time)*
William J. Light, *Technical Assistant (part-time)*
Francis F. Filice, *Research Associate*
Joel W. Hedgpeth, *Research Associate*
A. Myra Keen, *Research Associate*
Franz B. Steiner, *Field Associate*
Robert R. Talmadge, *Field Associate*

JUNIOR ACADEMY

Ken Lucas, *Supervisor*
Darrel McKenzie, *Instructor (part-time)*

LIBRARY

Ray Brian, *Librarian*
Clara Gross, *Assistant Librarian (part-time)*
Miriam Barnett, *Library Assistant (part-time)*
Doris Cantou, *Library Assistant (part-time)*
Mary Stilwell, *Library Assistant*
Laurie Umeh, *Library Technician*
Don Chunn, *Student Assistant*
Stanley Cohen, *Student Assistant*
Alice Gillogley, *Student Assistant*
Elena Goodman, *Student Assistant*
Julian Arntz, *Library Associate*
Margaret W. Campbell, *Library Associate*
Anson Herrick, *Library Associate*

MAINTENANCE AND OPERATING

William L. Denevi, *Chief Stationary Engineer*
George F. Murphy, *Senior Stationary Engineer*
Andrew J. Bell, *Stationary Engineer*
Ralph Clemens, *Stationary Engineer*
John Daley, *Stationary Engineer*
Albert Kravitz, *Stationary Engineer*
John Weaver, *Stationary Engineer*
John T. Phillips, *Museum Guard*
Frank Rogers, *Museum Guard*
Joseph A. Gomez, *Janitor Sub-foreman*
Rachel Wortherly
Louis M. Blakely
Nathan C. Cole
Bernard Conlon
James Jackson, Jr.
Eugenio Luis

OFFICE

Paul G. Brislawn, *Accountant*
E. Sue Weaver, *Membership Coordinator*
Marian Ganapol, *Membership Secretary (part-time)*
Dorothy N. Lohmeyer, *PBX Receptionist*
Olive T. Lucich, *Assistant Bookkeeper*
Irene Clayton, *Stenographer*

ORNITHOLOGY AND MAMMALOGY

Robert T. Orr, *Chairman and Curator*
L. Binford
Jacqueline Schonewald, *Technical Assistant*
Charlotte H. Dorsey, *Secretary (part-time)*
Michael D. Garrett, *Technical Assistant (part-time)*
Marilou Person, *Technical Assistant (part-time)*
Robert I. Bowman, *Research Associate*
Anatole S. Loukashkin, *Research Associate*
Dorcas E. MacClintock, *Research Associate*
J. Stuart Rowley, *Research Associate*
Walter A. Sheppe, *Research Associate*
J. Dan Webster, *Research Associate*
John R. Arnold, *Field Associate*
Raymond Bandar, *Field Associate*

PACIFIC DISCOVERY

Bruce Finson, *Editor*
Johan Kooy, *Art Director*

PHOTOGRAPHY

Maurice C. Giles, *Scientific Photographer*
Lloyd E. Ullberg, *Staff Photographer*

PICTURE COLLECTION

Johan Kooy, *Chairman*
Paul Anderson, *Associate*
Muriel French, *Associate*

PUBLIC INFORMATION

Hal Richardson

SALES—INFORMATON

Edna Abbott
Vera E. Bullis
Ruth T. Bush
Erna D. Geils
Lilian I. Grainger
Marion S. Kellogg
Marion Mortenson
Maj O'Reilly
Fay Read
Greta Traub
Irene Williams
Mary P. Wilson

SCIENTIFIC PUBLICATIONS

Edward L. Kessel, *Editor*
Winifred S. O'Neill, *Editorial Assistant*
Glen S. Hayden

STAFF PUBLICATIONS

ANDERSON, STEVEN C.
1968 A casque-headed frog from Sinaloa. Pacific Discovery, vol. 21, no. 2, pp. 25-27.

ANDERSON, STEVEN C., and ALAN E. LEVITON
1967 A new species of *Eremias* (Reptilia: Lacertidae) from Afghanistan. Occ. Pap. California Acad. Sci., no. 64, 4 pp.
—— A new species of *Phrynocephalus* (Sauria: Agamidae) from Afghanistan, with remarks on *Phrynocephalus ornatus* Boulenger. Proc. California Acad. Sci., ser. 4, vol. 35, pp. 227-234.
—— (See: Leviton, Alan E., and Steven C. Anderson)

ARNAUD, PAUL H., JR.
1968 [Review of] The mosquitoes of the South Pacific (Diptera, Culicidae, by John N. Belkin. Pan-Pacific Ento., vol. 43, p. 330.
—— Francis X. Williams, 1882-1967. Pan-Pacific Ento., vol. 43, p. 325.

ARNAUD, PAUL H., JR., and THOMAS W. DAVIES
1967 (See: Davies, Thomas W., and Paul H. Arnaud, Jr.)

BACIGALUPI, RIMO, JOHN THOMAS HOWELL, and LAWRENCE R. HECKARD
1967 (See: Howell, John Thomas, Lawrence R. Heckard, and Rimo Bacigalupi)

BULLIS, HARVEY R., JR., and W. N. ESCHMEYER
1968 (See: Eschmeyer, W. N., and Harvey R. Bullis, Jr.)

BURGHARDT, GLENN E.
1967 [Review of] Sea shells of the world with values, by A. Gordon Melvin. Pacific Discovery, vol. 20, no. 1, p. 32.
—— Snail with a spear. Pacific Discovery, vol. 20, no. 3, p. 18.

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1967 Observations on *Pleurobranchaea californica* MacFarland, 1966 (Opisthobranchia, Notaspidea). Proc. California Acad. Sci., ser. 4, vol. 32, pp. 515-521.

CHURCH, CLIFFORD C.
1968 Lower Cretaceous Foraminifera of the Orchard Peak-Devils Den area, California. Proc. Califorina Acad. Sci., ser. 4, vol. 32, pp. 523-580, pls. 1-8.
—— Shallow water Foraminifera from Cape San Lucas, Lower California. Proc. California Acad. Sci., ser. 4, vol. 30, pp. 357-380.

CLARK, RICHARD J.
1967 Herpetofauna of the islands of the Argo-Saronic Gulf, Greece. Proc. California Acad. Sci., ser. 4, vol. 35, pp. 23-36.

DAVIES, THOMAS W., and PAUL H. ARNAUD, JR.
1967 A remarkable aberrant female of *Speyeria nokomis nokomis* (Edwards) (Lepidoptera; Nymphalidae). Pan-Pacific Ento., vol. 43, pp. 179-181, 1 col. pl.

DEMPSTER, ROBERT P., EARL S. HERALD and PHYLLIS J. ENSRUD
1967 (See: Herald, Earl S., Robert P. Dempster, and Phyllis J. Ensrud)

ENSRUD, PHYLLIS J., EARL S. HERALD and ROBERT P. DEMPSTER
1967 Table d'hote at Steinhart. Pacific Discovery, vol. 20, no. 2, pp. 25-27, 5 figs.
—— (See: Herald, Earl S., Robert P. Dempster, and Phyllis J. Ensrud)

ESCHMEYER, WILLIAM N., and HARVEY R. BULLIS, JR.
1968 Four advanced larval specimens of the blue marlin, *Makaira nigricans*, from the western Atlantic Ocean. Copeia, 1968, pp. 414-417.

ESCHMEYER, W. N., and ALWYNE WHEELER
1968 (See: Wheeler, Alwyne, and W. N. Eschmeyer)

FOLLETT, W. I.
1968 Fish remains from two submerged deposits in Tomales Bay, Marin County, California. Occ. Pap. California Acad. Sci., no. 67, 8 pp.

FOLLETT, W. I., and VADIM D. VLADYKOV
1967 (See: Vladykov, Vadim D., and W. I. Follett)

GASPERETTI, JOHN
1967 Survey of the reptiles of the Sheikhdom of Abu Dhabi, Arabian Peninsula. Part I. A geographical sketch of the Sheikhdom of Abu Dhabi. Proc. California Acad. Sci., ser. 4, vol. 35, pp. 141-156.

HANNA, G. DALLAS
1967 [Review of] Geology illustrated, by John S. Shelton. Pacific Discovery, vol. 20, no. 4, p. 32.

HECKARD, LAWRENCE R., JOHN THOMAS HOWELL, and RIMO BACIGALUPI
1967 (See: Howell, John Thomas, Lawrence R. Heckard, and Rimo Bacigalupi)

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Without the support of the business community, foundations, and individuals the Academy's programs of scientific research, public exhibitions, and education would not be possible. Many of its most important activities are unknown to the casual visitor to the aquarium and museum halls. Among the business organizations and foundations that are assisting the Academy in its essential work are:

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There are thousands of individuals who help support the Academy's work in many ways: through gifts and pledges of money; by gifts of property; through membership dues; by their own volunteer services; and by providing for future needs through bequests. We are grateful to all of our friends, individuals, corporations and foundations, for their timely and thoughtful partnership in the work of the Academy.

CALIFORNIA ACADEMY OF SCIENCES

COMBINED BALANCE SHEET, JUNE 30, 1968

ASSETS

Cash		
Commercial accounts	$ 112,248	
Savings accounts (Note 3)	394,660	$ 506,908
Receivables		
Research grants	101,673	
Other	6,127	107,800
Inventories		8,131
Investments, at cost		
Land		608,084
Commercial Building	516,819	
Accumulated depreciation	(516,819)	—
Securities		
Special purposes fund (market value $495,590)	429,641	
Endowment fund (market value $1,611,395; pledged $210,000)	1,383,346	1,812,987
Buildings (appraised value $12,580,600; Note 2)		—
Collections, library and equipment, at cost (Note 4)		968,307
Other assets		11,107
		$4,023,324

LIABILITIES AND FUND BALANCES

Note payable to a bank with securities pledged as collateral		$ 210,000
Accrued interest		1,050
Unexpended construction funds (Note 3)		290,602
Total liabilities		501,652
Fund balances		
Operating, unrestricted	$ 70,034	
Endowment, unrestricted	1,818,992	
Restricted to research	119,742	
Restricted to plant improvements	50,571	
Restricted to other special purposes	494,026	
Collections, library and equipment	968,307	3,521,672
		$4,023,324

The accompanying notes are an integral part of the financial statements.

CALIFORNIA ACADEMY OF SCIENCES

STATEMENT OF CHANGE IN FUND BALANCES
FOR THE YEAR ENDED JUNE 30, 1968

INCOME		
Contributions		
Membership dues		$ 47,411
Business organizations and foundations	49,487	
Individuals and trusts	122,262	$ 209,140
Operating		
From City and County of San Francisco for support of aquarium and museum operations	485,923	
From federal and state agencies for support of research and curatorial activities	73,386	
Planetarium	113,409	
Television	9,007	
Restaurant royalty	35,802	
Sundry sales	121,519	
Other	72,325	911,371
Endowment		
Rent from Commercial Building	154,412	
Interest and dividends	98,834	
Loss from sales of securities	(11,612)	241,634
Total income		1,362,165
EXPENDITURES		
Aquarium and museum	515,708	
Research financed by grants	175,815	
Planetarium	63,839	
Departmental research and curatorial activities	274,610	
Special purpose activities	17,837	
General and administrative	219,150	
Plant additions	9,655	
Cost of sundry sales	117,072	
Employees' pension annuity	19,204	
Interest	12,810	
Other	6,062	1,431,762
Net decrease in fund balances		(69,597)
FUND BALANCES, JULY 1, 1967		3,591,269
FUND BALANCES, JUNE 30, 1968		$3,521,672

The accompanying notes are an integral part of the financial statements.

CALIFORNIA ACADEMY OF SCIENCES

NOTES TO FINANCIAL STATEMENTS

JUNE 30, 1968

1. Accounting Method

The Academy has established the practice of recording gifts and bequests only when received.

2. Buildings

No amount appears on the balance sheet for buildings because under the terms of the charter of the City of San Francisco no one other than the City may own buildings on City property. Thus, as the Academy facilities in Golden Gate Park (which is City property) were acquired, title was transferred to the City of San Francisco.

The cost of buildings transferred to the City to date is $2,354,362.

The appraised value of these buildings was determined by independent appraisal in 1968.

3. Unexpended Construction Funds

The H. S. Cowell Foundation committed a total of $1,550,000 to the Academy for a new building in 1967. Construction of Cowell Hall, with a contract price to date of $1,294,000, was begun in 1967 and will be completed in April 1969.

The balance of unexpended construction funds represents the net of commitment received to date of $1,033,333 and payments to the contractor of $742,731. These net funds are temporarily held in a savings account.

4. Collections, Library and Equipment

The Academy staff has estimated the current replacement value of the collections, library and equipment to be in excess of $10,000,000.

ACCOUNTANTS' OPINION

The Board of Trustees
California Academy of Sciences
San Francisco, California

We have examined the combined balance sheet of the California Academy of Sciences as of June 30, 1968 and the related statement of change in fund balances for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying combined balance sheet and the related statement of change in fund balances present fairly the financial position of the California Academy of Sciences at June 30, 1968, and the results of its activities for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

L. H. PENNEY & CO.

San Francisco, California
August 23, 1968

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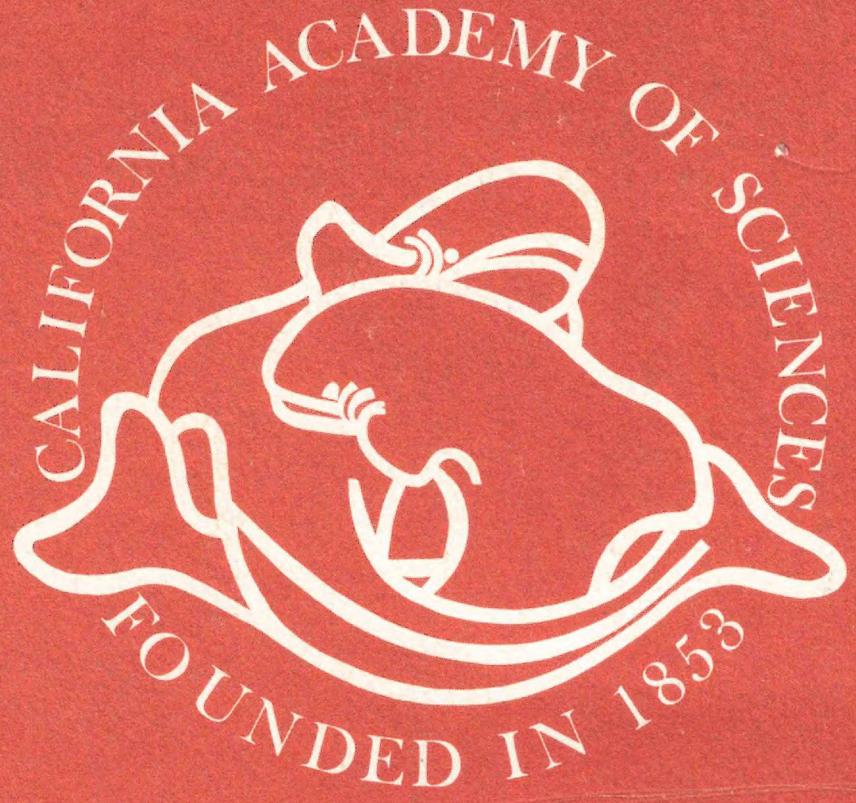
SPECIAL gifts and bequests to the Academy come in many forms and sizes and all are appreciated and put to immediate good use. They cover a broad range from a building to a curatorial chair to unrestricted funds used for the purchase of a small piece of laboratory equipment, all contributing indispensably to the Academy's scientific and educational programs.

Voluntary financial support for museums of natural history and research centers is so important that state and national governments allow substantial tax benefits for gifts made during one's lifetime or by will. These benefits encourage citizens to support the Academy's work.

There are opportunities for partnership with the California Academy of Sciences in many areas of scientific endeavor, and there are many ways in which a donor's intentions can be accomplished. You or your attorney can obtain details by contacting any of our trustees, or the director of the Academy.



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